Course Code: *UGSTAT-101*	*Course Title : Statistical Methods*	*Maximum Marks :* 30

Section -A
Long Answer Questions

Note: Attempt any three questions. Each question should be answered in 800 to 1000 Words.

Maximum Marks: 18

1. Discuss about the Arithmetic Mean with its application and merits and demerits. Also prove that the A.M. is not independent of change of origin and scale.

2. Discuss about the different methods of diagrammatic representation of statistical data.

3. Discuss about the Regression. Find out the angle between two regression lines.

Section - B
Short Answer Questions

Maximum Marks: 12

Note: Attempt any four questions. Answer should be given in 200 to 300 Words.

1. Define Coefficient of Variation. For what purpose is it used?

2. What is the difference between multiple bar diagram and divided bar diagram.

3. Distinguish between Frequency Curve and Frequency Polygon.

4. Write a note on the Quartile Deviation with its merits, demerits and uses.

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सांख्यिकी (स्नातक) कार्यक्रम अधिन्यास सत्र 2022–23

Course Code: *UGSTAT-102*	*Course Title:* *Probability & Distribution*	*Maximum Marks : 30*

Section - A
Long Answer Questions

Note: Attempt any three questions. Each question should be answered in 800 to 1000 Words.

Maximum Marks: 18

1. What is random variable? Differentiate the probability mass function (p.m.f.) and probability density function (p.d.f.).

2. Each of n urns contains four white and six black balls, while another urn contains five white and five black balls. An urn is chosen at random from these intel urns and two balls are drawn from it both being black. The probability that five white and three black balls remain in the chosen urn is 1/7. Find the value of n.

3. Prove that: If a sufficient estimator exists, then maximum likelihood estimator is a function of the sufficient estimator.

Section - B
Short Answer Questions

Maximum Marks: 12

Note: Attempt any four questions. Answer should be given in 200 to 300 Words.

1. If $X \sim B(10, \frac{1}{4})$. Then calculate the mean and variance of the distribution.

2. What is mathematical expectation? Also calculate the values of $E(ax_1 + bx_2)$ and $V(ax_1 + bx_2)$ where X_1 and X_2 be the iid random variables.

3. State and Prove Baye's theorem.

4. Discuss about Contingency table and Yates correction.

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सांख्यिकी (स्नातक) कार्यक्रम अधिन्यास सत्र 2022–23

Course Code: UGSTAT-103	Course Title: Sampling Theory & Design of Experiment	Maximum Marks : 30

Section - A
Long Answer Questions

Note: Attempt any three questions. Each question should be answered in 800 to 1000 Words.

Maximum Marks: 18

1. Calculate the mean and variance of SRSWOR.

2. Define linear models. Also give the complete lay out of one way classified data also give its ANOVA.

3. If population consists of a linear trend, than prove that
$$V(\overline{Y}_{st}) \geq V(\overline{Y}_{sys}) \geq V(\overline{Y}_{srswor})$$

Section - B
Short Answer Questions

Maximum Marks: 12

Note: Attempt any four questions. Answer should be given in 200 to 300 Words.

1. Write short note on Precision and Efficiency of Design

2. Distinguish the Difference Between multistage Sampling and two phase Sampling.

3. Write the basic assumptions of RBD. Also discuses its advantages and disadvantages.

4. Discuss about the sources of non response errors.

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सांख्यिकी (स्नातक) कार्यक्रम अधिन्यास सत्र 2022–23

Course Code: *UGSTAT-104*	*Course Title : Applied Statistics*	*Maximum Marks : 30*

Section - A
Long Answer Questions

Note: Attempt any three questions. Each question should be answered in 800 to 1000 Words.

Maximum Marks: 18

1. Define index number. Also give an idea about the ideal Index Number.

2. Describe control charts. Also draw the steps control chart of $\bar{x}$ & R.

3. Explain GRR and NRR. Show that NRR $\leq$ GRR. Why? When GRR will be equal to NRR.

Section - B
Short Answer Questions

Maximum Marks: 12

Note: Attempt any four questions. Answer should be given in 200 to 300 Words.

1. Give the different steps for p-chart and d-chart.

2. Discuss about the time series. Also give its different trends.

3. Define Infant mortality rate and maternal mortality rate.

4. Discuss about the Fisher's Index number.

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सांख्यकी (स्नातक) कार्यक्रम अधिन्यास सत्र 2022–23

Course Code: *UGSTAT-105*	*Course Title:* *Advance Statistical Inference*	*Maximum Marks : 30*

Section - A
Long Answer Questions

Note: Attempt any three questions. Each question should be answered in 800 to 1000 Words.

Maximum Marks: 18

1. State and prove Crammer - Rao inequality.

2. Distinguish parametric and non parametric test.

3. Define MVU estimators. Also obtain the MVUE for μ in the normal population N (μ, σ^2), where σ^2 is known.

Section - B
Short Answer Questions

Maximum Marks: 12

Note: Attempt any four questions. Answer should be given in 200 to 300 Words

1. Write short notes on (a) Power of test (b) Level of Significance

2. Discuss about the confidence interval and confidence coefficient.

3. Define Consistent estimator.

4. Let X_1 , X_2 .... , X_n be a random sample of size n from uniform (O, θ). Then obtain sufficient estimator for θ.

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सांख्यिकी (स्नातक) कार्यक्रम अधिन्यास सत्र 2022–23

Course Code:	*Course Title:*	*Maximum Marks : 30*
DECSTAT - 106	***Basic Knowledge of Statistical Software***	

Section- A
Long Answer Questions

Note: Attempt all questions. Each question should be answered in 800 to 1000 Words.

Maximum Marks: 18

1. Volcanologist have measured the hydrogen content (in % of total number of atoms) of sample of gases collected from the 1970 and 1971 Mount Etna volcanic eruptions. Values are given in the following table:

1970		1971	
Hydrogen Content (%)		Hydrogen Content(%)	
35.8	38.5	42.0	45.0
45.5	36.0	57.0	44.6
35.5	40.5	42.0	48.5
32.0	35.5	54.5	63.0
50.0	45.5	35.0	55.0
39.0	37.0	52.0	40.0
37.0	36.0	43.5	37.5
47.0	53.0	48.0	53.7

(a) Use the Student's t-test for comparing means to determine whether there is a difference in the hydrogen content of the gases between the two eruptions at the 99% confidence level.

2. If the population of shell length to width ratios of a species of bivalve is normally distributed with a mean of 1.65 and a standard deviation of 0.05, what is the probability that any one shell picked at random has a length-to-width ratio: (i) less than 1.65 (ii) within two standard deviations of the mean.

3. Stating the underlying assumptions, give the derivation of a Poisson process.

Section - B

Short Answer Questions

Note: Answer all questions. Answer should be given in 200 to 300 Words.

Maximum Marks: 12

1. Briefly explain the use of the following commands in MATLAB:
   a. grid ( )
   b. plot ( )
   c. title ( )

2. Write short notes on SPSS. Also define the Data view and variable view.

3. Find the probability distribution of inter arrival time for a Poisson process.

4. Prove that if a Poisson process has occurred once in time interval (O,a], then the point at which it occurs is distributed uniformly over interval (0,a].

Course Code:	*Course Title:*	*Maximum Marks : 30*
DECSTAT-108	*Official Statistics*	

Section - A
Long Answer Questions

Note: Attempt any three questions. Each question should be answered in 800 to 1000 Words.

Maximum Marks: 18

1. Discuss about the use of statistics in different fields. And also Discuss about the use of Statistics in day to day life.

2. Discuss about the various optical agencies responsible for data Collection.

3. Discuss about the methods of Collection of data.

Section - B
Short Answer Questions

Maximum Marks: 12

Note: Attempt any four questions. Answer should be given in 200 to 300 Words

1. Describe, How Statistics is useful in the field of Agriculture.

2. Write some limitations of the data Collection methods.

3. What is Census?

4. Define migration how can its effects the population of any area.

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सांख्यकी (स्नातक) कार्यक्रम अधिन्यास सत्र 2022–23

Course Code: DECSTAT-109	Course Title: Operation Research	Maximum Marks : 30

Section - A
Long Answer Questions

Note: Attempt any three questions. Each question should be answered in 800 to 1000 Words.

Maximum Marks: 18

1. Discuss about the Linear Programming Also Define the different steps for Graphical solution to LPP.

2. Write a detailed not on classification of models used in operations research.

3. What is a game problem? How do we solve these problems using LPP technique? Give example.

Section - B
Short Answer Questions

Maximum Marks: 12

Note: Attempt any four questions. Answer should be given in 200 to 300 Words.

1. Discuss in brief about the Hungarian method.

2. Write a note on pay off matrix.

3. What is a dual problem? How do we get a dual of given primal?

4. State and prove reduction theorem for assignment problems.

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सांख्यकी (स्नातक) कार्यक्रम अधिन्यास सत्र 2022—23

Course Code: *SBSSTAT-04*	*Course Title:* *Numerical Methods & Basic Computers Knowledge*	*Maximum Marks : 30*

Section - A
Long Answer Questions

Note: Attempt any three questions. Each question should be answered in 800 to 1000 Words.

Maximum Marks: 18

1. State and Prove Newton – Gregory Backward Interpolation formula

2. What do you understand by divided difference? Show that they are symmetrical in all the arguments.

3. Distinguish between Machine Language and Programming language. Describe high level language.

Section - B
Short Answer Questions

Maximum Marks: 12

Note: Attempt any four questions. Answer should be given in 200 to 300 Words.

1. Discuss about the Disk Management Commands.

2. Draw a flow chart to obtain factorial of positive integer n.

3. Discuss about the Stirling's formula and Bessel's formula.

4. Discuss about the different generations of the computers.